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Hidden Players in a Deadly Game: Biological Warfare Programs Worldwide

An Intelligence Assessment

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December 1988
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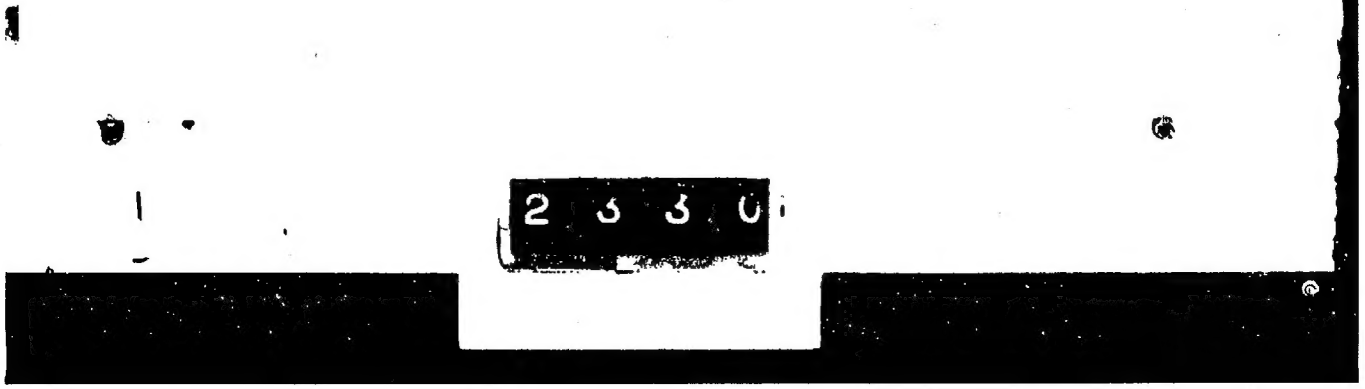
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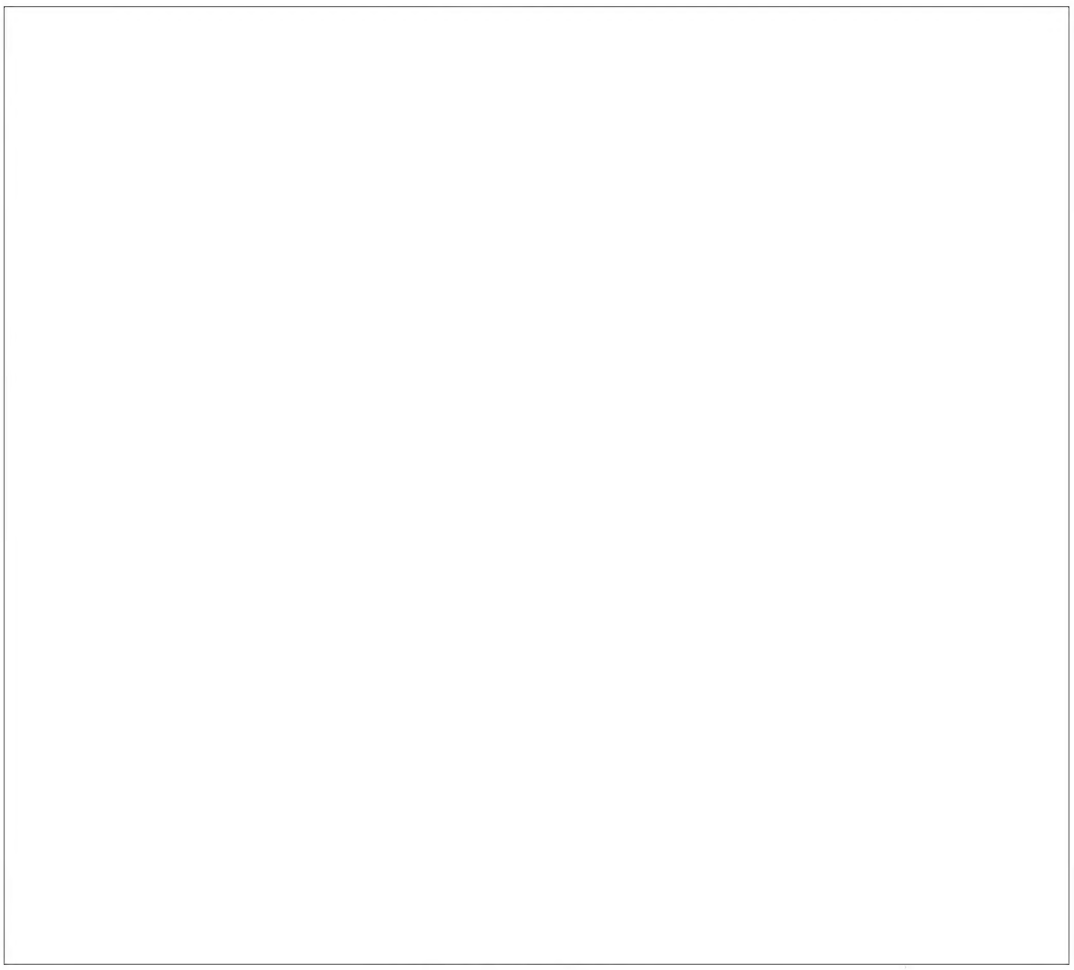
Hidden Players in a Deadly Game: Biological Warfare Programs Worldwide

Key Judgments

Information available as of 1 November 1988 was used in this report.

Many countries are discovering that, with the technologies available today, biological weapons are potentially one of the most lethal weapons of mass destruction ever developed:

Any country with a modestly developed industrial base and a reasonably mature defense industry can establish a biological warfare (BW) capability—if it chooses to do so. Any nation--and possibly some terrorist groups—could develop and deploy biological agents.



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Appendixes

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Hidden Players in a Deadly Game: Biological Warfare Programs Worldwide

Biotechnology: The Ominous Shadow of Biological Warfare

Biotechnology, broadly defined, includes any technique that uses living organisms (or parts of organisms) to make or modify products, improve plants or animals, or develop microorganisms for specific uses. Genetic engineering is a subset of biotechnology. (U)

Traditional biological agents include pathogens and toxins. Pathogens are living organisms that can reproduce and cause disease. Toxins are biochemical products of living organisms and may cause illness or death. (U)

[redacted]

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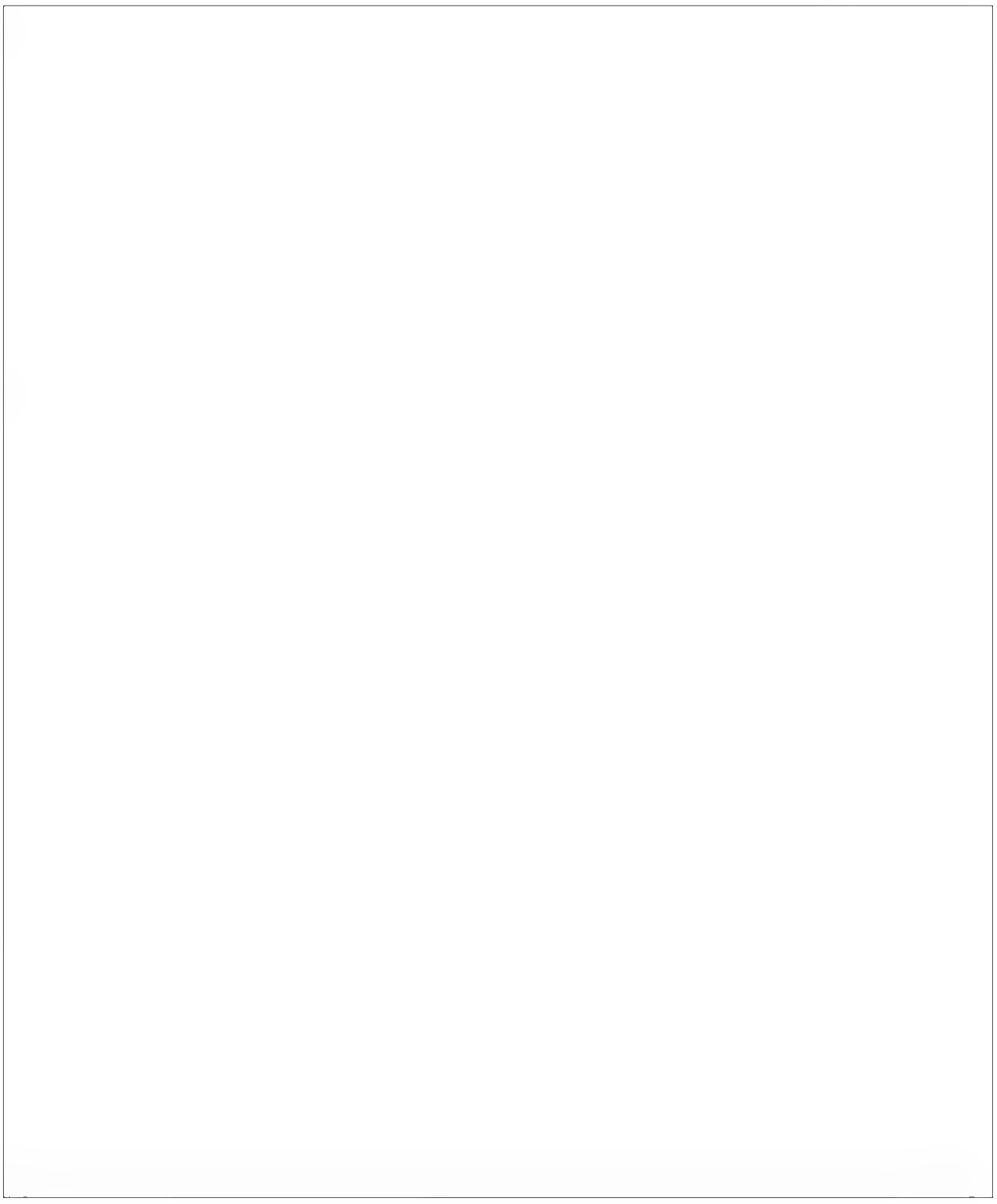
[redacted] Microencapsulation is a method of enclosing microscopic drops or particles within individual protective sheaths composed of certain organic compounds. This technique, introduced in 1954, is used for everything from carbonless copy forms to timed-release pharmaceuticals. It can be used to protect aerosolized agents from the sun's radiation, immediate drying, widely varying temperatures, and the explosive force of munitions. [redacted]

[redacted] Genetic engineering is the joining of a part of the hereditary code of one organism to that of another. [redacted]



In November 1987 a threat was made against development of the US Strategic Defense Initiative by a Soviet official, Valentin Falin:

> *. . . We'll take asymmetrical means with new scientific principles available to us. Genetic engineering could be a hypothetical example. Things can be done for which neither side could find defenses or countermeasures, with very dangerous results. If you develop something in space, we could develop something on Earth. These are not just words. I know what I'm saying.*

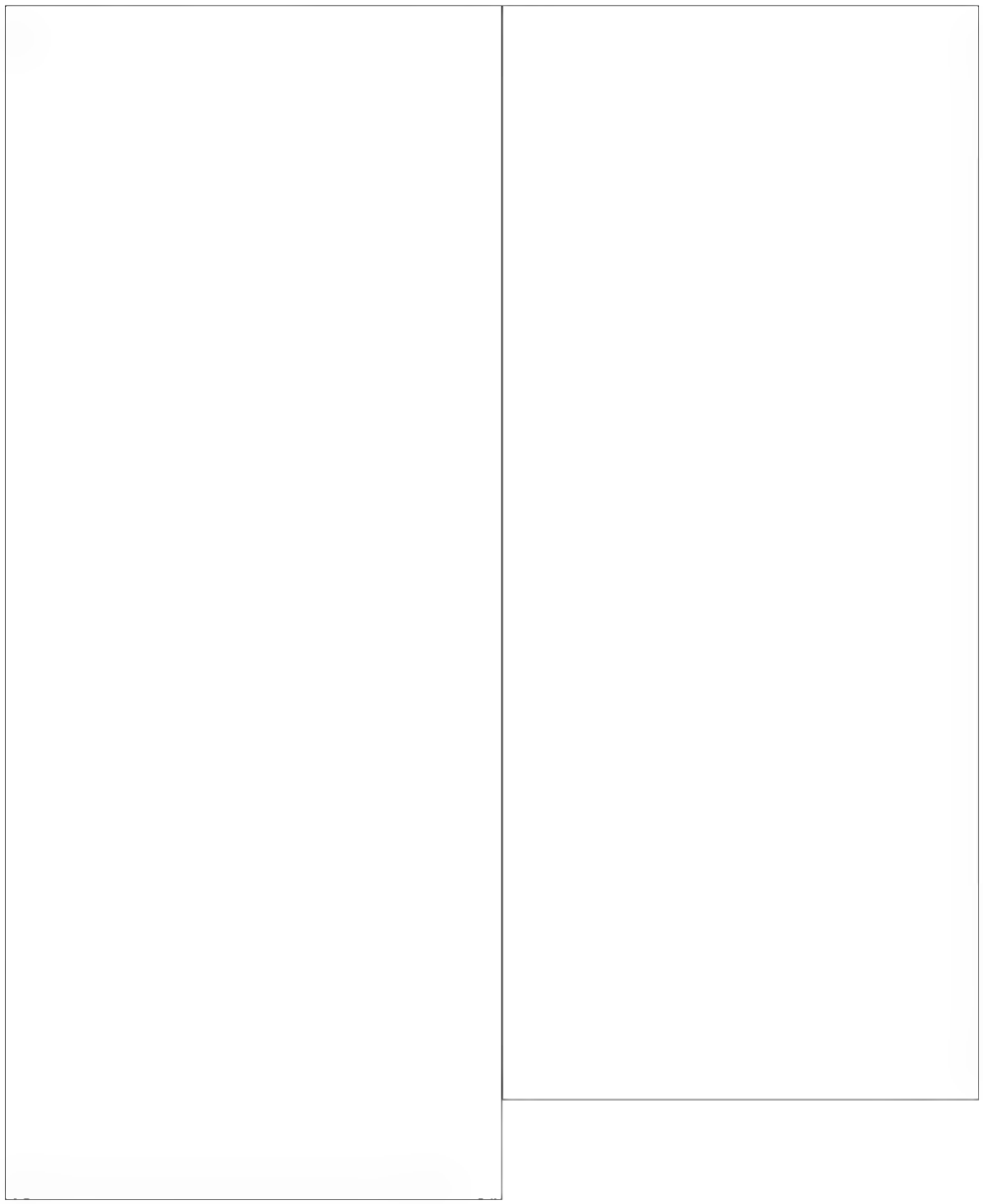
History of the Biological Weapons Convention

The Geneva Protocol of 1925 prohibited the use—but not stockpiling or research and development (R&D)—of both poison gas and bacteriological methods in warfare. During World War II, new and more toxic nerve gases were developed, and R&D was begun on biological weapons. However, neither side used such weapons during World War II.

On 25 November 1969 the United States unilaterally renounced all methods of biological warfare. The Department of Defense disposed of all existing stocks of biological agents and weapons. The following year, the ban, and subsequent disposal, was extended to biological toxins.

The US actions were widely welcomed internationally, and the example set by the United States was followed by other countries. It was generally recognized, however, that unilateral actions could not take the place of a binding international commitment. As a result, the Biological Weapons Convention (BWC) was negotiated in 1972. Entitled "Convention on the Prohibition of the Development, Production, and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on Their Destruction," the convention has been signed by 111 countries. Under its terms, the parties undertake not to develop, produce, stockpile, or acquire biological agents or toxins "of types and in quantities that have no justification for prophylactic, protective, and other peaceful purposes," as well as weapons and means of delivery.

The convention was essentially a good-faith treaty and, thus, has no provisions for formal verification or for punishment for noncompliance. It is of unlimited duration.



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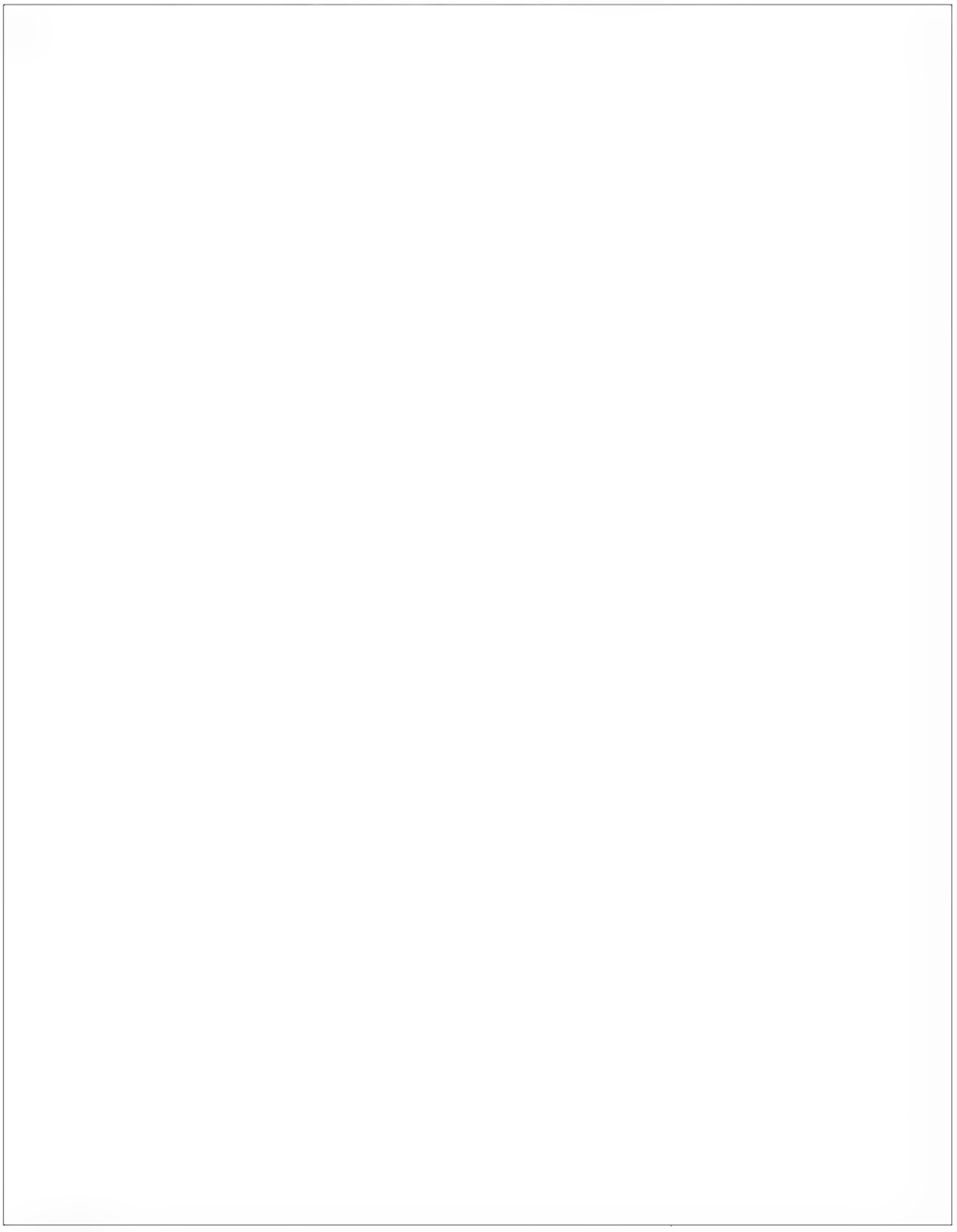

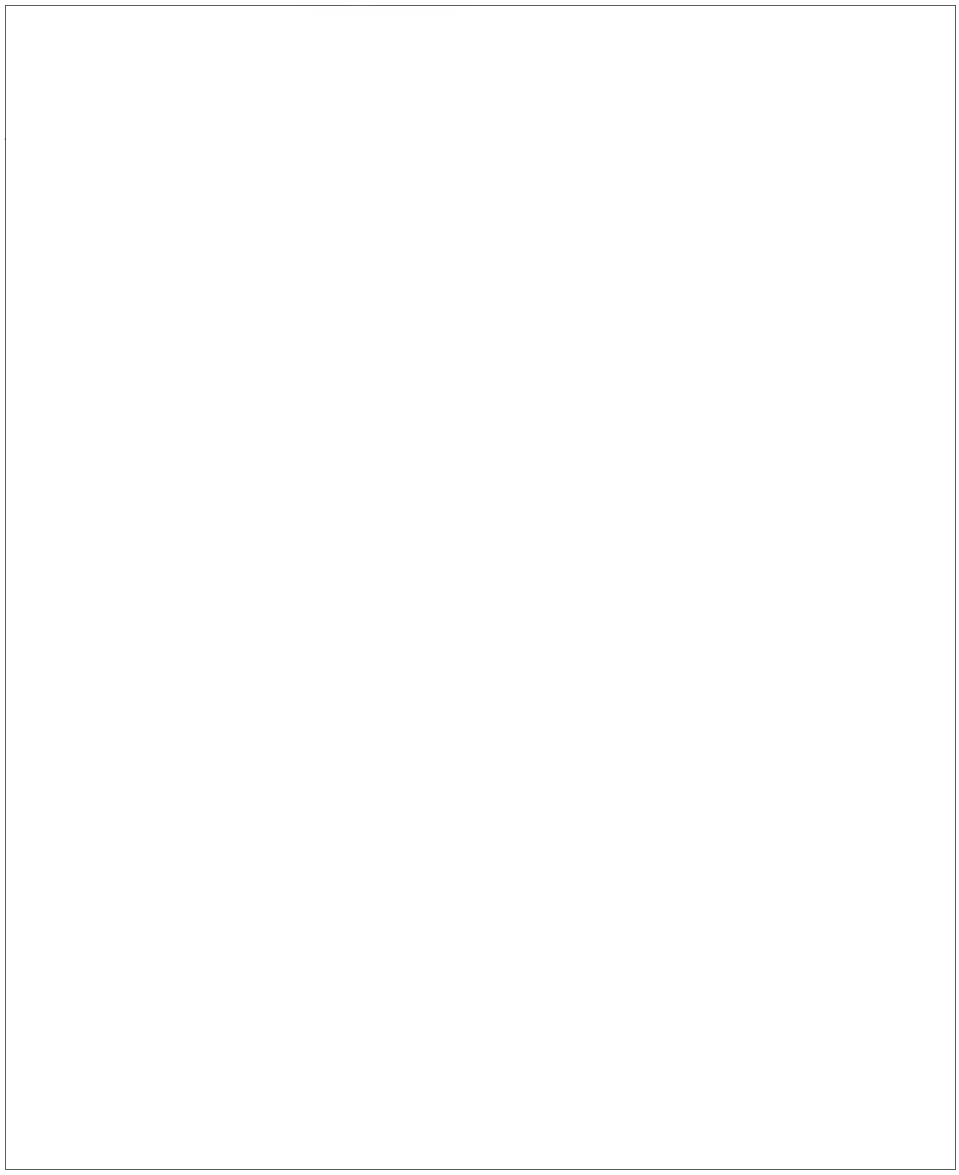

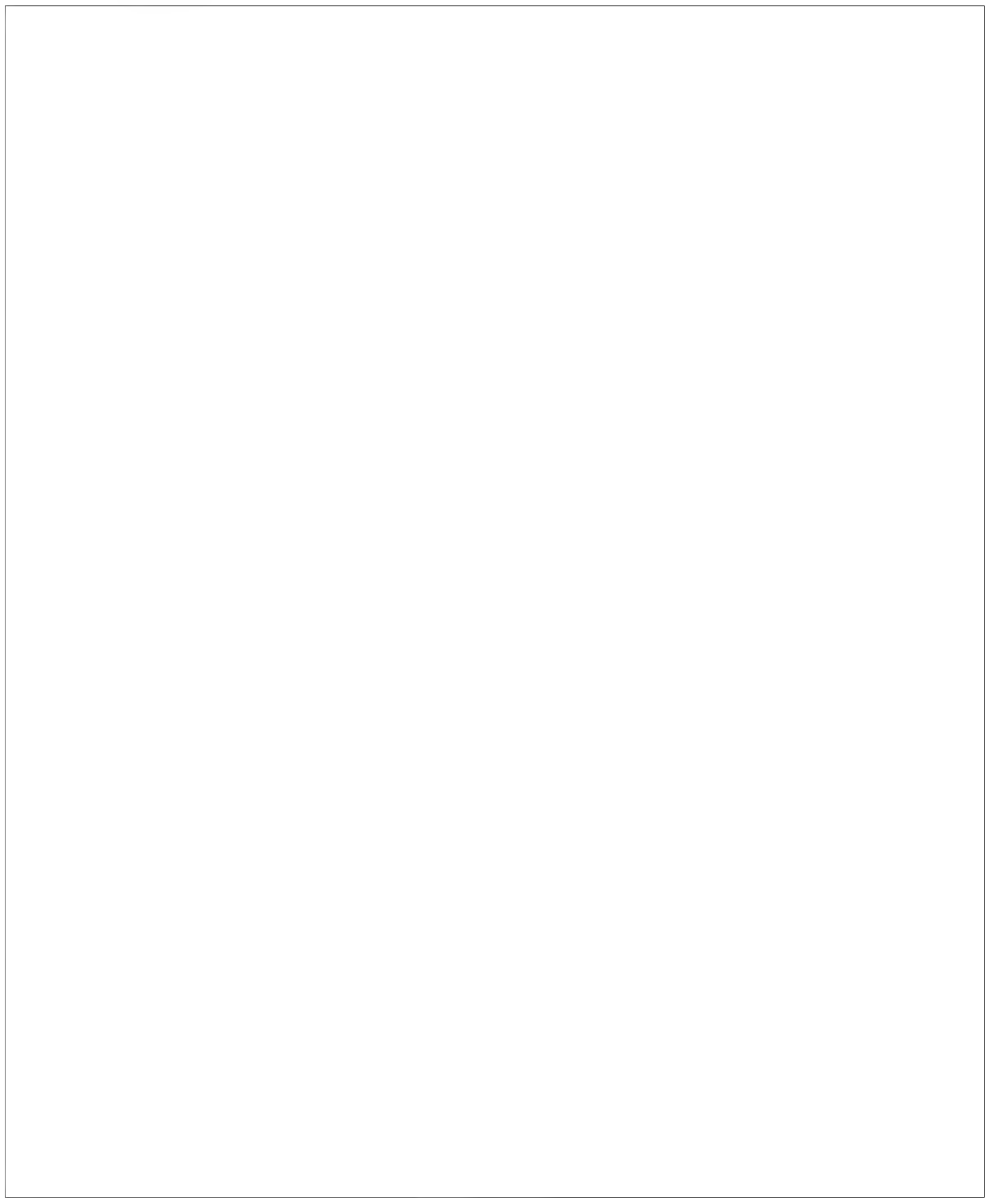

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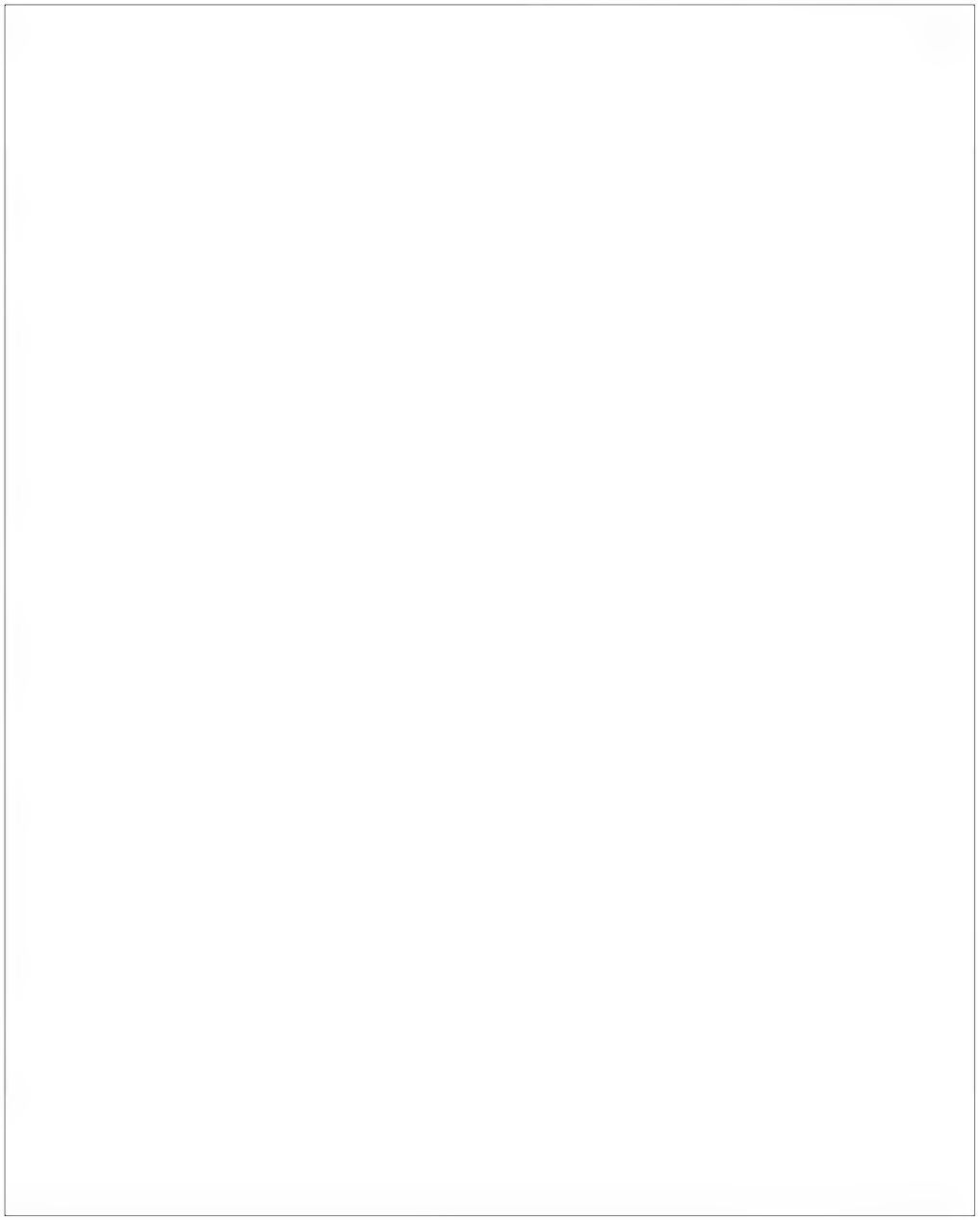

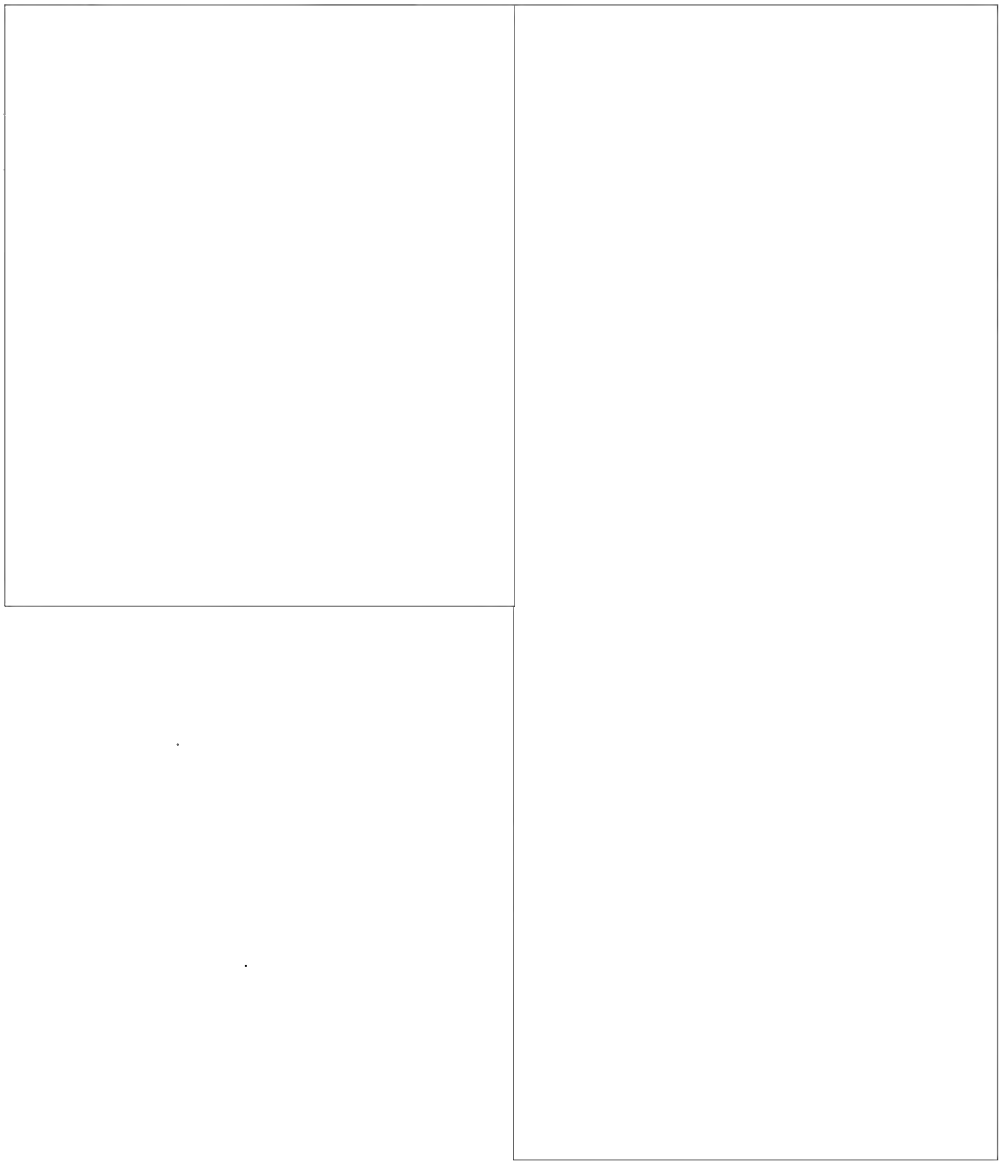

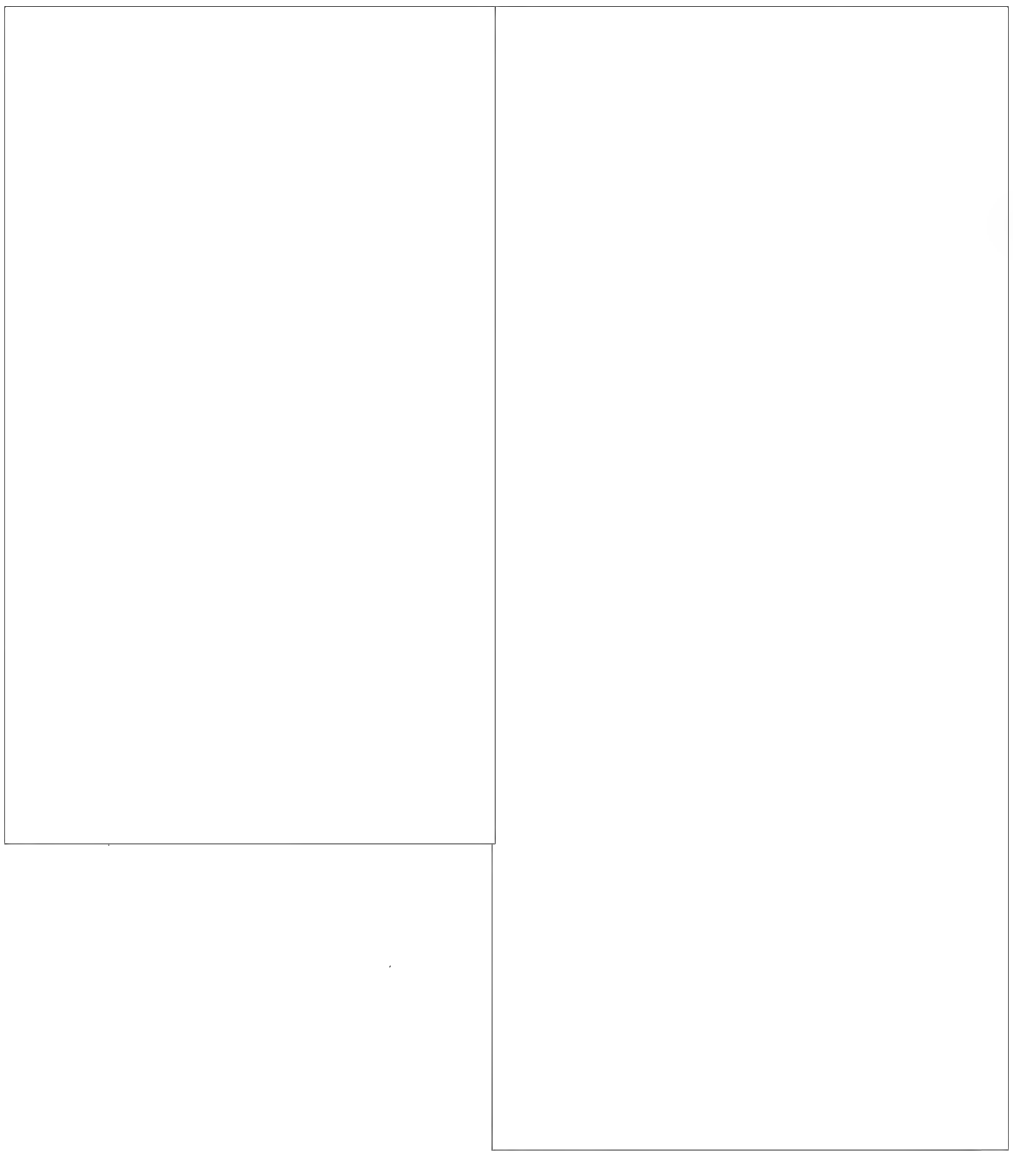

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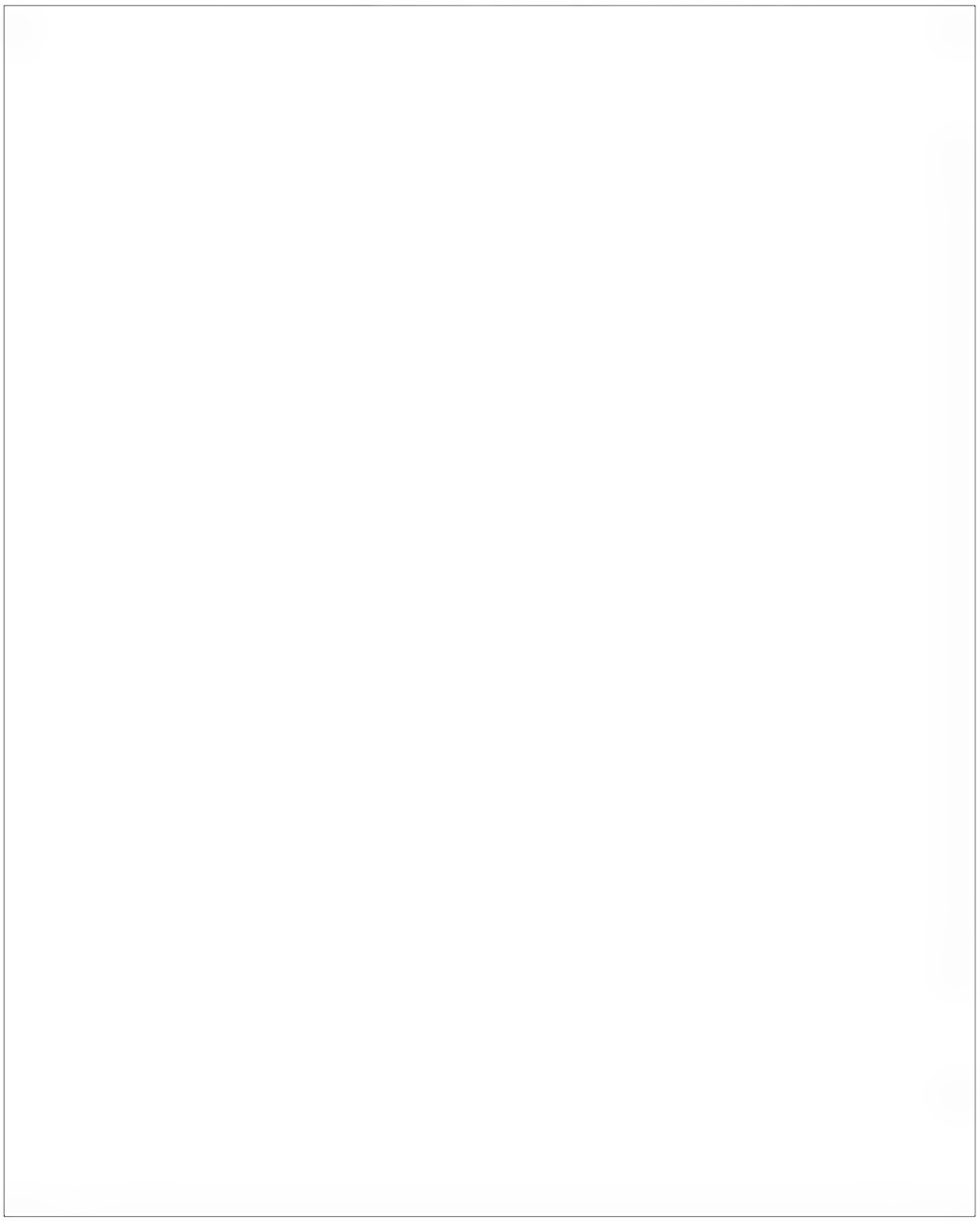

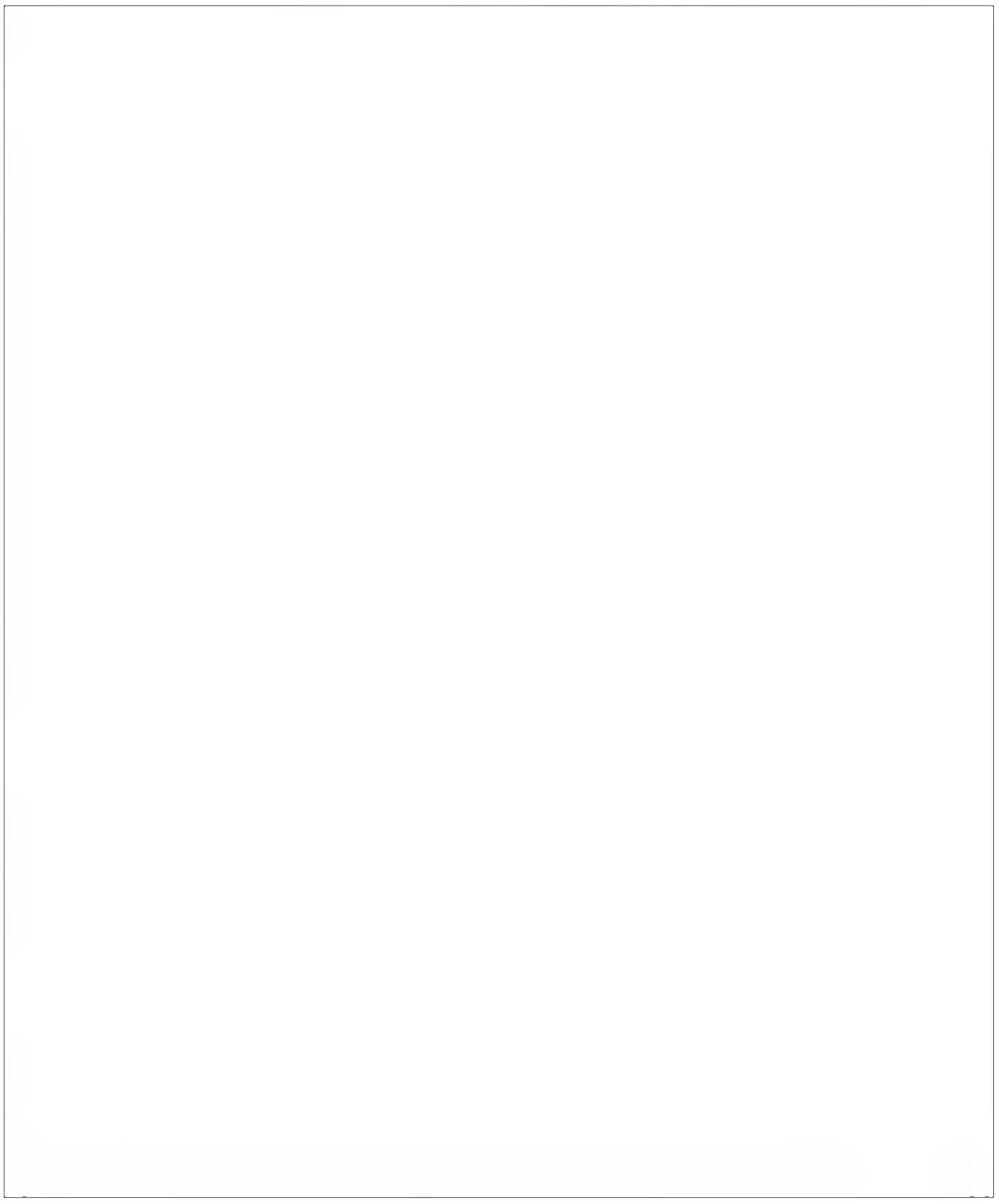

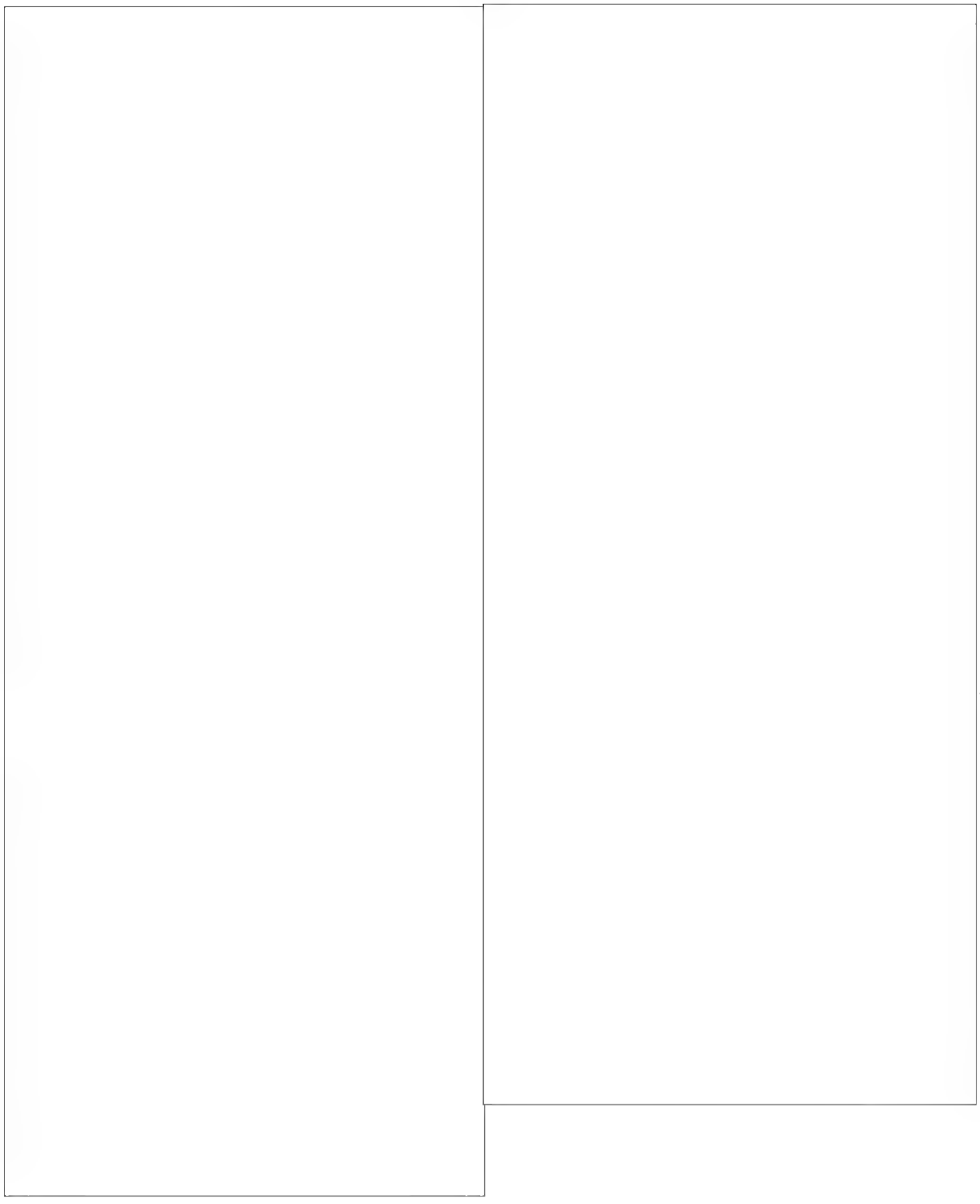

Indonesia

In late 1984, President Suharto endorsed the idea of developing an "industry for biochemical warfare" because other nations were already using "poisonous gas." At that time, we believed that (1) Indonesia was primarily interested in developing a defensive capability, and (2) an effort toward developing an offensive capability would have been directed toward CW only.

in 1978 the Indonesian Army established NUBIKA—its nuclear, biological, and chemical warfare directorate—for the purpose of developing offensive and defensive capabilities in both chemical and biological warfare. Reportedly, NUBIKA wanted to develop a defensive capability first and then eventually develop and stockpile chemical and biological weapons. in 1982, NUBIKA's operating plan changed because its new director was opposed to developing an offensive capability. The new director agreed, however, that the Army should have a defensive capability.

Additional, although possibly suspect, information also supports our assessment that Indonesia may be interested in developing an offensive BW capability. NUBIKA was involved in the production of "virulent bacteria and viruses." Research was reportedly carried out at the State Serological and Immunological Institute (BIOFARMA) at Bandung. stated that the NUBIKA unit was staffed by graduate engineers, chemists, microbiologists, and bacteriologists.

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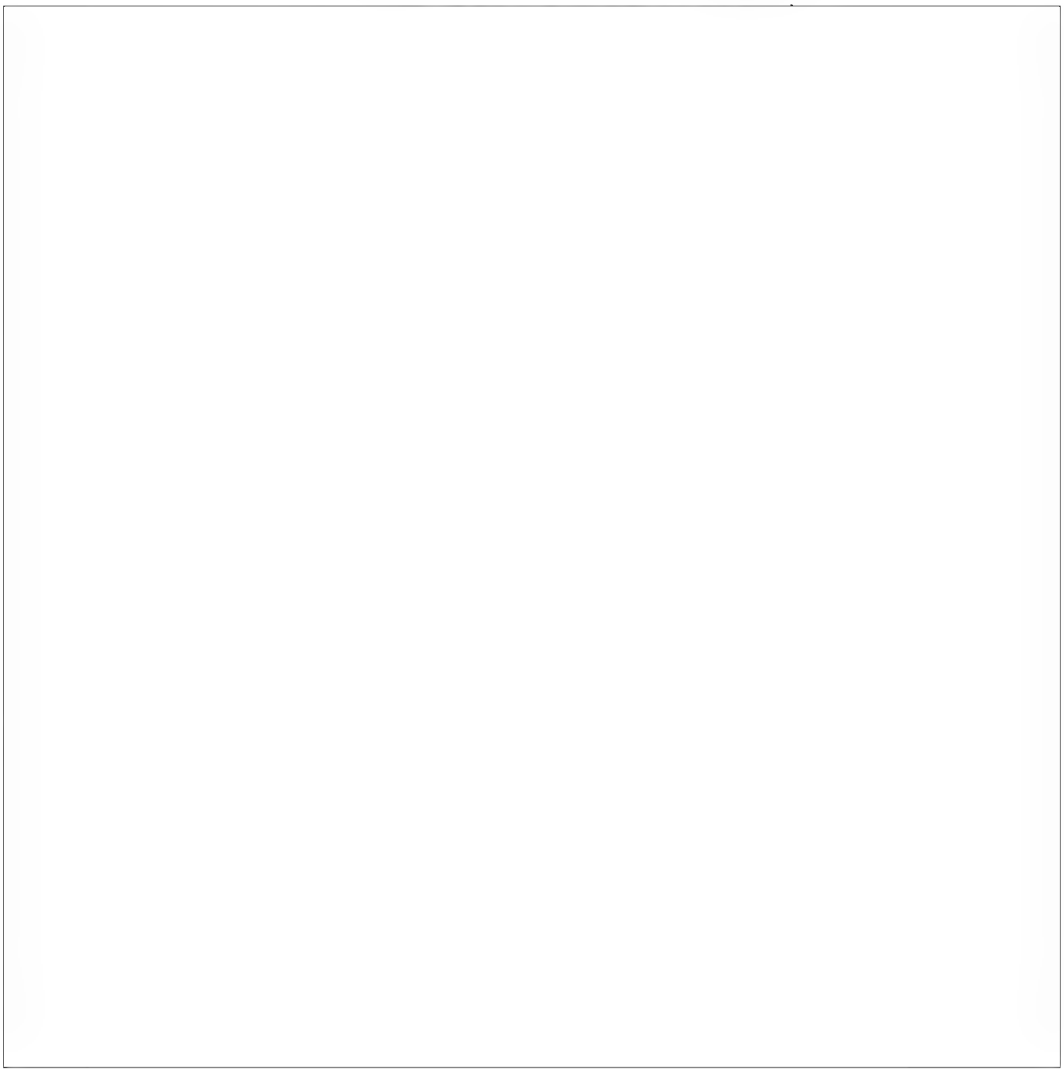

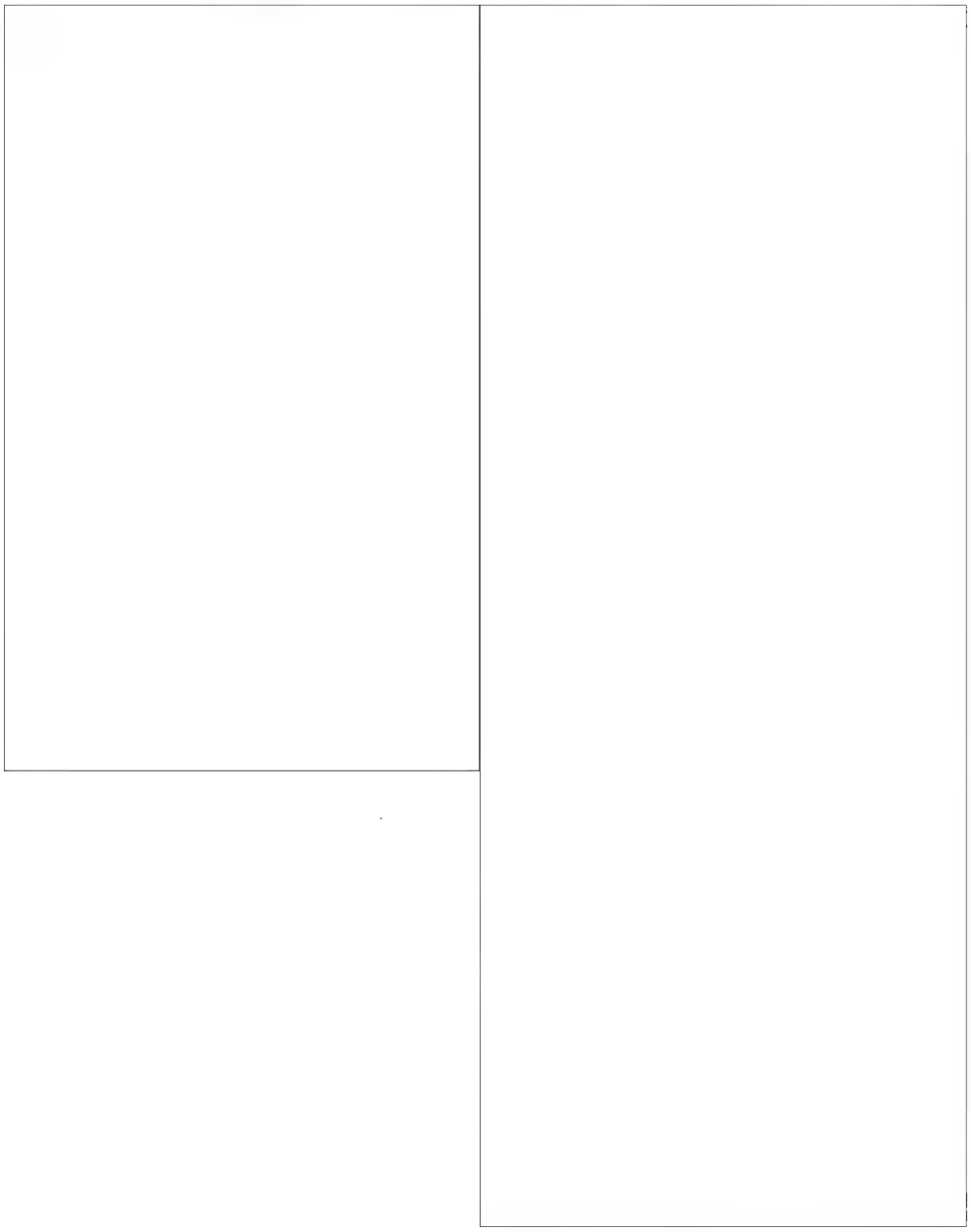

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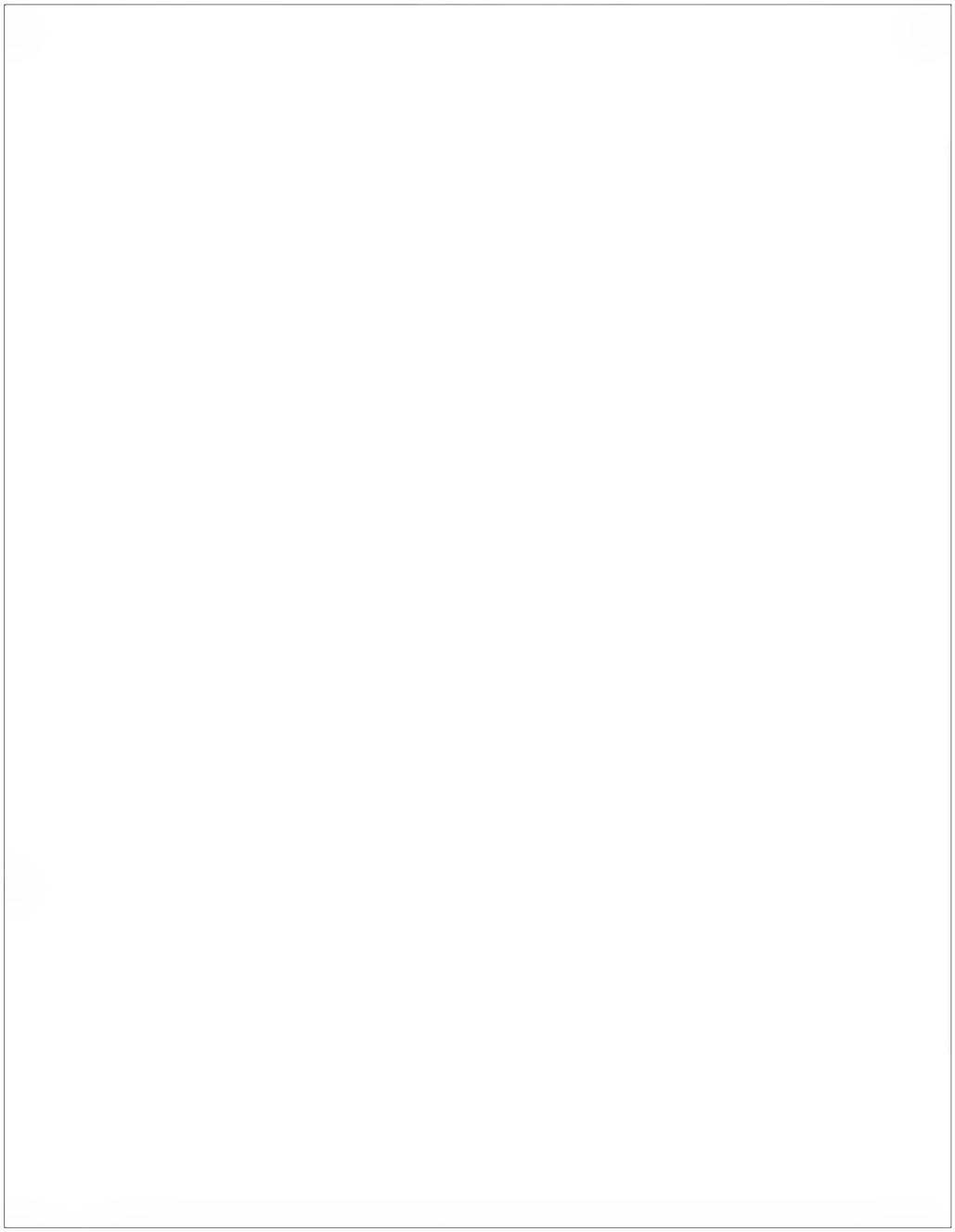


Implications

The Balance-of-Power Effect

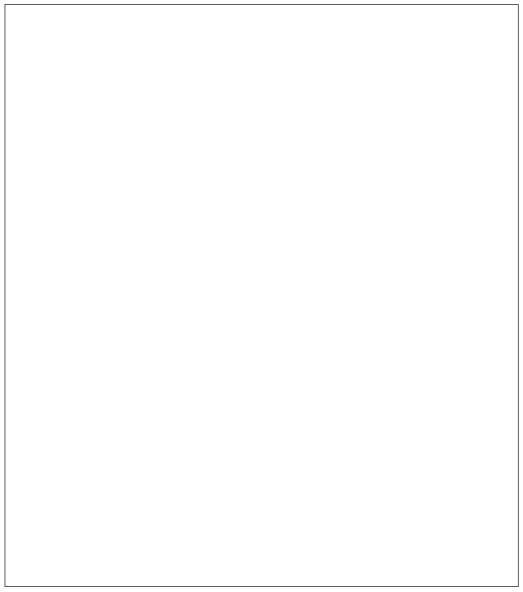
As with the spread of chemical weapons, biological weapons proliferation invokes a chain reaction within a proliferant's region of influence. A nation's acquisition of biological weapons is likely to cause its neighbors to reassess their military requirements. Once the step is taken to develop a defensive posture, it, technically, is a simple matter to cross the line to develop an offensive capability. In regions where other military forces are not balanced, possession of a BW capability may enhance a nation's force posture and offer a degree of national self-sufficiency and self-assurance not otherwise available.

Compared with development of nuclear weapons, production of which requires development of a highly specialized technical base and acquisition of unique materials, biological weapons can be produced from more readily accessible materials, often using relatively unsophisticated technology. For these reasons, BW proliferation is more likely to occur in response to recognition of a new regional BW threat than is the case with nuclear weapons.

The Effect on Arms Control

The convention prohibits BW weapons development, except for "prophylactic, protective or other peaceful purposes." This wording is understood to ban deterrent arsenals. The term "development" is not, however, defined, and there is no consensus on where to place the dividing line between prohibited and permitted R&D.

At the time the convention was signed—103 countries initially became signatories—there was little military interest in biological weapons. Now, with development of new technologies, such as molecular biology and genetic engineering, that is no longer so.



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Appendix A

Aerosols

Many chemical agent candidates are solid or liquid under normal conditions and thus do not naturally volatilize to produce the necessary military concentrations in air; such agents have to be used as aerosols. By generating aerosols, very high concentrations of CW agents in the air can be achieved, although for limited times.

Aerosols are temporary systems of solid or liquid particles in air, such as smoke, dust, or mists. Militarily, the major factors in duration of the aerosol are wind and particle size. Wind causes a more or less rapid spread of the aerosol and with it a reduction of the particle concentration. Gravity's effect (sedimentation) on the particle is directly proportional to the aerodynamic size of the particle. In general, as the particle size increases the sedimentation rate increases and the system loses stability. The smaller the particle size, the more stable the aerosol. Military systems are generally designed to produce a weapon-specific narrow band of particle sizes (monodispersive aerosol) to fulfill target servicing requirements.

Although some large aerosols are designed for adsorption of the agent through the skin, the majority are designed for inhalation of the agent. The effectiveness of poisoning by inhalation of aerosols is comparable to an intravenous injection. The speed and extent of resorption present in aerosol form depends on various factors. The particle size of the aerosol (as well as the number of particles) is of decisive importance because it determines the depth of penetration into the lungs. Particles with a diameter of 0.5 micron (0.5×10^{-4} cm) penetrate to the deepest portions of the lungs (the alveoli), while larger particles are deposited earlier in the upper air passages, and smaller particles are flushed from the lungs during exhalation. The transfer of material from the alveoli to the bloodstream meets little resistance because the substances only have to penetrate the capillary walls of the alveoli. This same transfer allows macromolecular substances in aerosol form to enter the body, thus its importance in the application of bacterial or synthetic toxins.

Appendix B

Biohazard Containment

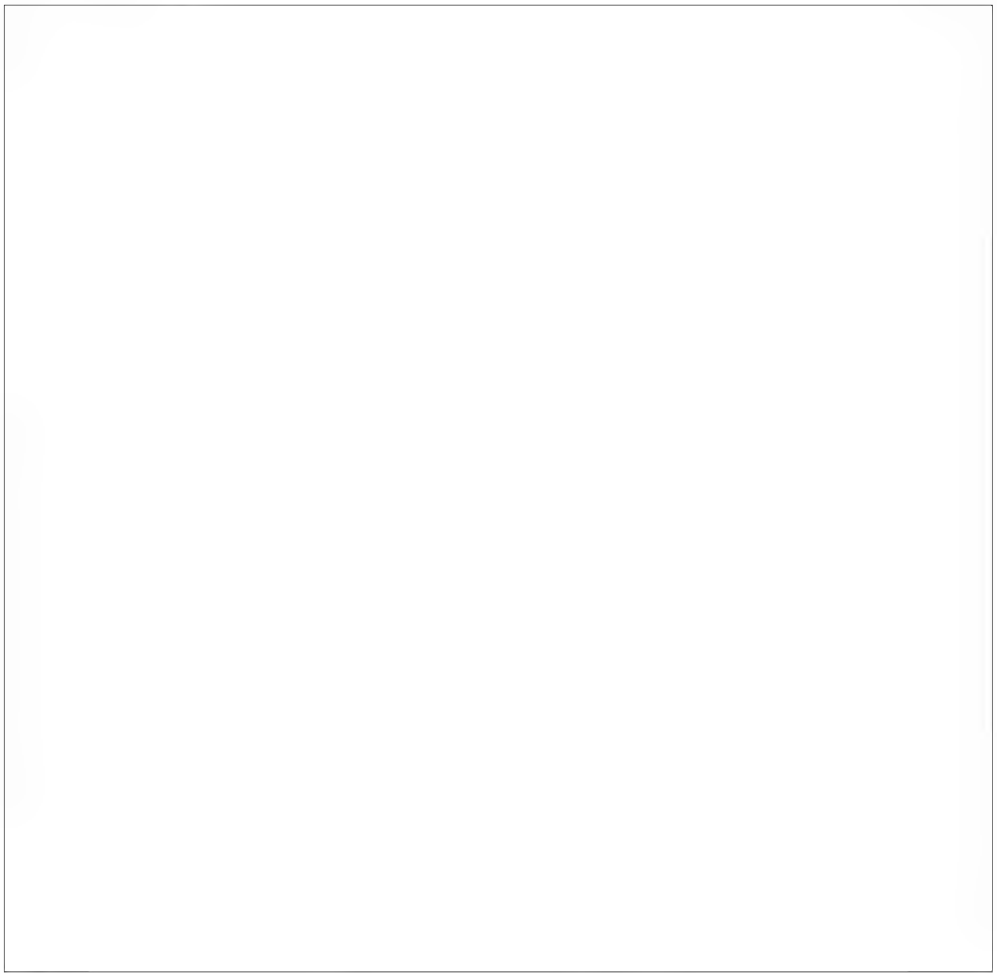
Prophylactic measures must be taken at special health care and biological research facilities to prevent the spread of disease-causing organisms, viruses, and biotoxins that may be present while working with infectious patients and contaminated specimens. The US biological research community created an internationally accepted scale of biohazard containment measures conforming to various levels of risk associated with biohazards. The four internationally recognized biohazard-containment (or biosafety) levels are P-1 (for basic precautions), P-2, P-3, and P-4 (for maximum containment).

P-1 biosafety level consists of standard microbiological laboratory practices and safety techniques. No special containment facilities or safety equipment are required.

P-2 biosafety level includes P-1–level practices plus the use of laboratory coats and protective gloves, decontamination of all infectious waste, limited or controlled access to P-2 areas, and biohazard warning signs. In addition, a P-2 facility would have partial-containment equipment for the performance of procedures that have a high exposure risk. The containment equipment would typically include class III or class II (low containment) biological safety cabinets, also known as hoods, which maintain internal negative pressure to control potential leaks. The safety precautions associated with a P-2 laboratory are roughly analogous to what might be expected in a hospital room.

P-3 biosafety level includes P-2 level practices plus use of special laboratory clothing and controlled access to the P-3 area. In addition, the facility would have high containment biological safety cabinets, also known as glove boxes for use in the manipulation of infectious materials. Negative pressure would be maintained throughout P-3 laboratory areas to control potential leakage from glove boxes and containment equipment. The safety precautions associated with a P-3 laboratory are similar to those used in clean rooms in the aerospace and semiconductor industries.

P-4 biosafety level includes P-3–level practices plus a change and shower room at the entrance and exit points to the P-4 laboratory and decontamination of all waste leaving the facility. In addition, negative pressure would be maintained in areas surrounding the laboratory area, lower negative pressure would be maintained in the P-4 laboratory, and still lower negative pressure would be maintained for containment equipment in the laboratory. The equipment would include either class III (complete containment) biological safety cabinets or partial containment equipment in combination with use of full-body personnel suits supplied with positive air pressure.



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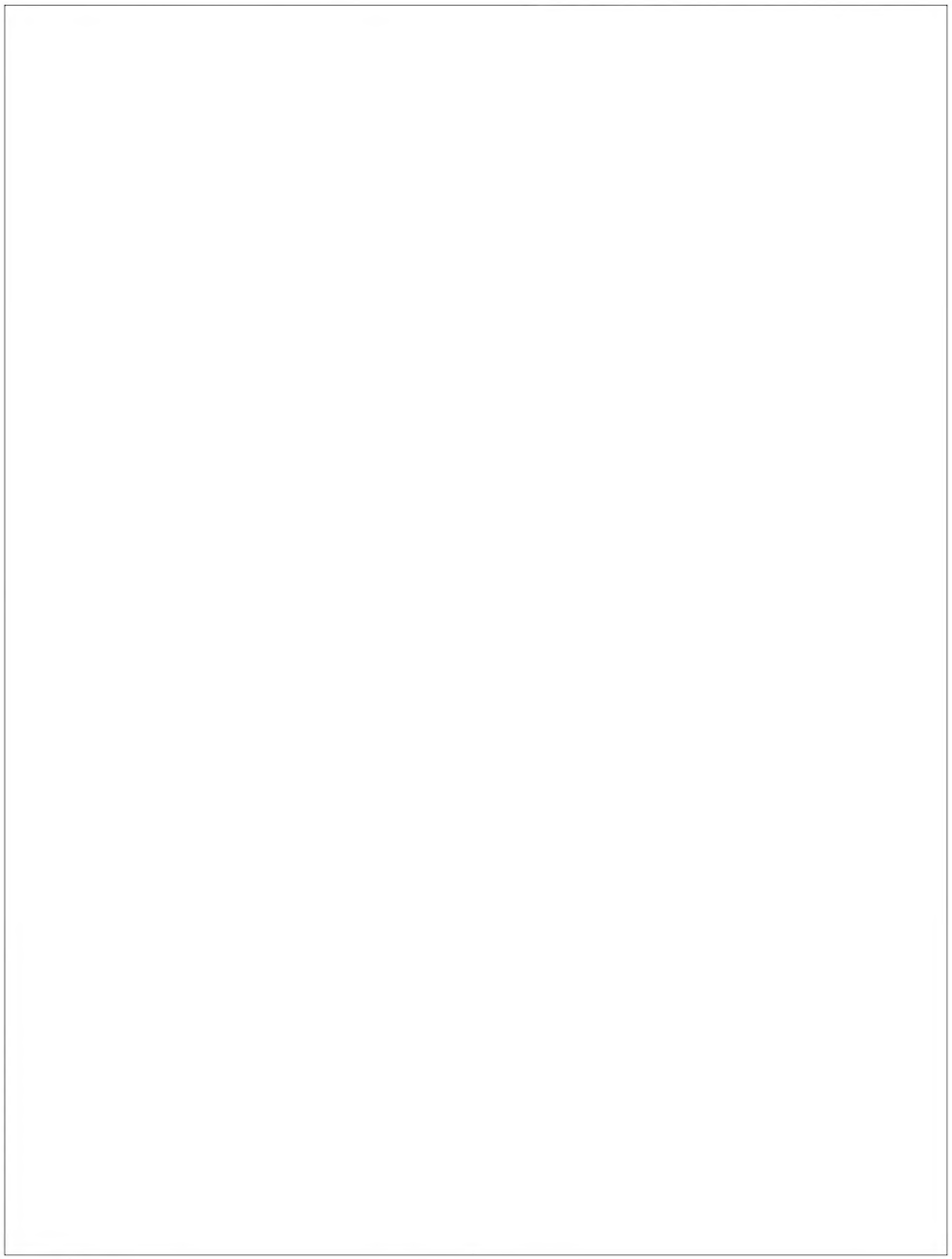

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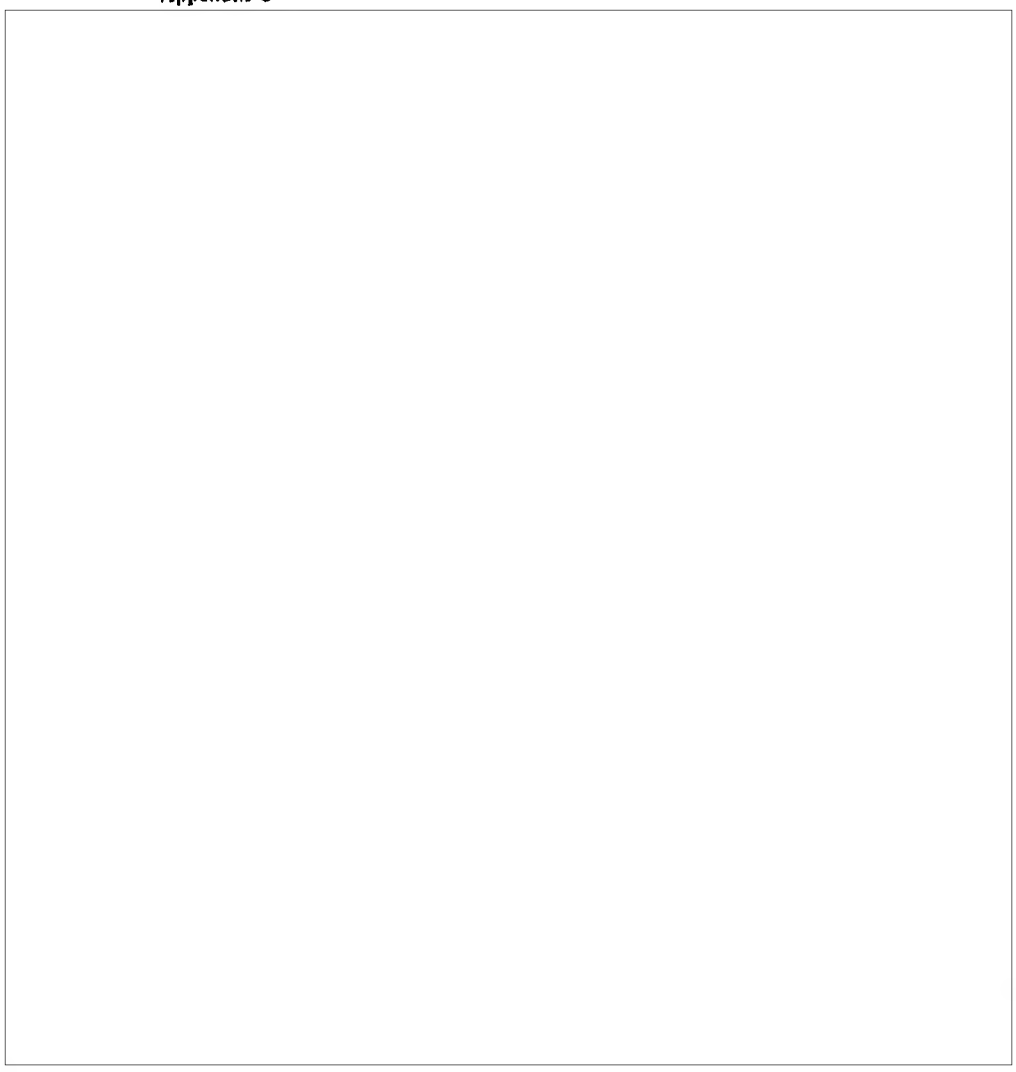

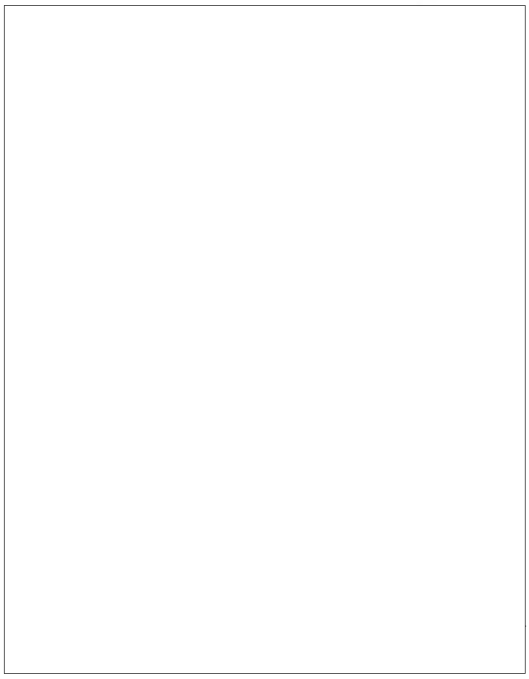

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